




Innovative Technologies:

*Phytoremediation
and
Composting*



Panel Members

- *Kellie Kachek - Corps of Engineers*
 - *Jeff Breckenridge - Corps of Engineers*
 - *Dr. Lee Newman - Univ of Washington*
 - *Greg Harvey - Air Force*
 - *Chuck Coyle - Corps of Engineers*
 - *Wayne Sisk - AEC*
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Innovative Technologies

- *Phytoremediation*
 - *Summary of Technology*
 - *Case Studies*
 - *Panel Discussion*
 - *Composting*
 - *Summary of Technology*
 - *Case Studies*
 - *Panel Discussion*
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Phytoremediation

- *Presenters*
 - *Dr. Lee Newman*
 - *Greg Harvey*
 - *Wayne Sisk*
- *Case Studies*
 - *Carswell Air Force Base, TX*
 - *Milan Army Ammunition Plant, TN*



Phytoremediation

- *Dr. Lee Newman*
- *Summary of Technology*



Phytoremediation

- *Greg Harvey*
- *Case Study: Carswell Air Force Base, TX*



Phytoremediation

- *Wayne Sisk*
- *Case Study: Milan Army
Ammunition Plant, TN*



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Composting





Composting

- *Presenters*
 - *Chuck Coyle*
 - *Wayne Sisk*
- *Case Studies*
 - *Umatilla Depot Activity, OR*
 - *Hawthorne Army Depot, NV*



Composting

- *Chuck Coyle*
- *Technology Summary*



Overview

- *Definition*
 - *Contaminants Amenable to Composting*
 - *Time / Cost*
 - *Guidance*
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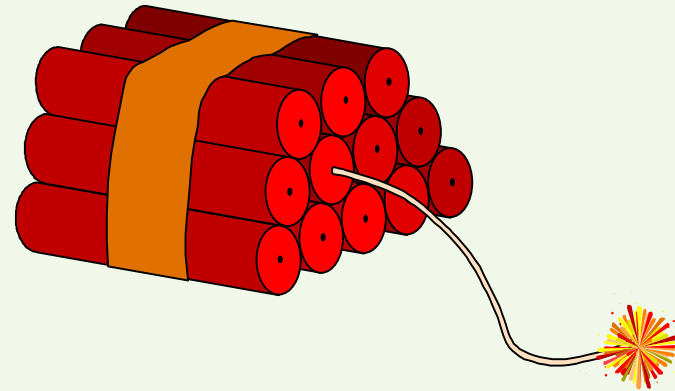


Definition of Composting

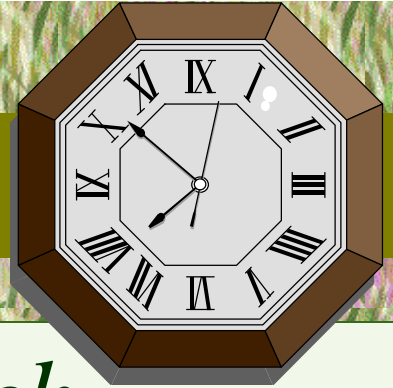
- *The biological decomposition of organic matter under controlled, aerobic conditions into a humus-like stable product.*

Contaminants Amenable to Composting

- *Some Pesticides*
- *PAHs*
- *Explosives*



Time



- *Approximately 2 weeks to reach cleanup goals, plus another 2 weeks for laboratory data turn around time*
- *Batch Size: 810 cy/batch at Umatilla*
- *About 4 weeks /810 cy at Umatilla*

Cost



- *Composting*
 - *Based on full scale operations at Umatilla: \$300-350/ton (\$400-470/cy)*
- *Incineration*
 - *Based on Savanna AD and NE OP (Mead): \$325-600/ton (\$440-810/cy)*

Guidance & Useful Project Documents



- *Army Environmental Center (AEC)*
 - *Umatilla Demonstration Report (1993)*
 - *Umatilla Cost Report (1996)*
- *US Army Corps of Engineers*
 - *Explanation of Significant Difference for Umatilla Record of Decision (1997)*
 - *Corps of Engineers Guide Specification for Composting (1998)*

Guide Specification for Composting

- *Corps of Engineers Guide Specification (CEGS), Bioremediation of Soils Using Windrow Composting*
- *To Acquire a Copy:*
 - *<http://www.hnd.usace.army.mil/techinfo/cegs/cegstoc.htm>*
 - *charles.g.coyle@usace.army.mil
402/697-2578*



Bioremediation of Soils Using Windrow Composting

- *Notes to Designer*
- *Compost Recipe*
- *Contractual Requirements (e.g. Monitoring)*



Composting

- *Wayne Sisk*
- *Case Studies:*
 - *Umatilla Depot Activity, OR*
 - *Hawthorne Army Depot, NV*



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Composting Panel Discussion

